# Over-Sand Driving at Cape Cod National Seashore: Research to Support Management of the OHV Experience



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# Presentation Outline

• Overview of park/recreation planning and research frameworks

• Cape Cod National Seashore Study

   •Phase I – Indicators of quality

   •Phase II – Standards of quality

• Management implications

# Park & Recreation Planning Frameworks

- Limits of Acceptable Change (LAC)
- Visitor Experience and Resource Protection (VERP)

# Underlying Rationale of Park & Recreation Planning Frameworks

- Formulate management objectives and associated indicators and standards of quality

- Monitor indicator variables

- Apply management practices to ensure that standards of quality are maintained

# Management Objectives

- Broad narrative statements that describe desired future conditions

Hypothetical Example: "Provide visitors with opportunities to engage a high quality OHV experience"

# Indicators of Quality

- Measurable, manageable variables that reflect the essence or meaning of management objectives; quantifiable proxies of management objectives

# Examples of Indicators of Quality

- Vehicles at one time on roadways or routes
- Trail encounters
- Trail impacts
- Unauthorized trails
- Traffic congestion
- Recreation conflict
- Waiting times
- Litter
- Graffiti
- Level of trail development

# Standards of Quality

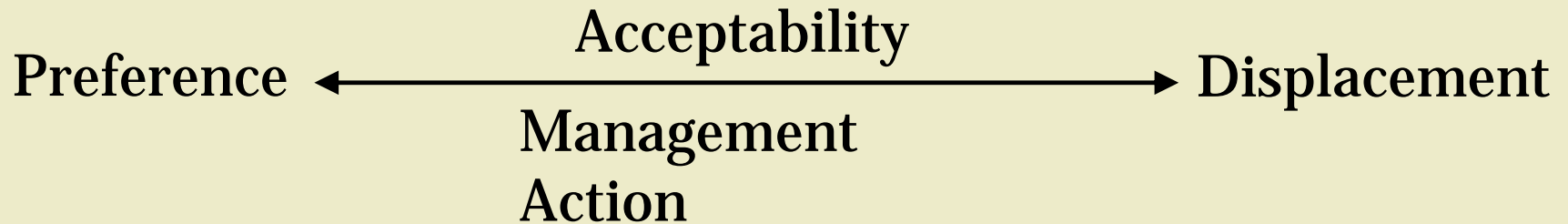- **Minimum acceptable condition of indicator variables**

Hypothetical Example: "A group should encounter, on average, no more than 10 other OHVs on the trail per day"
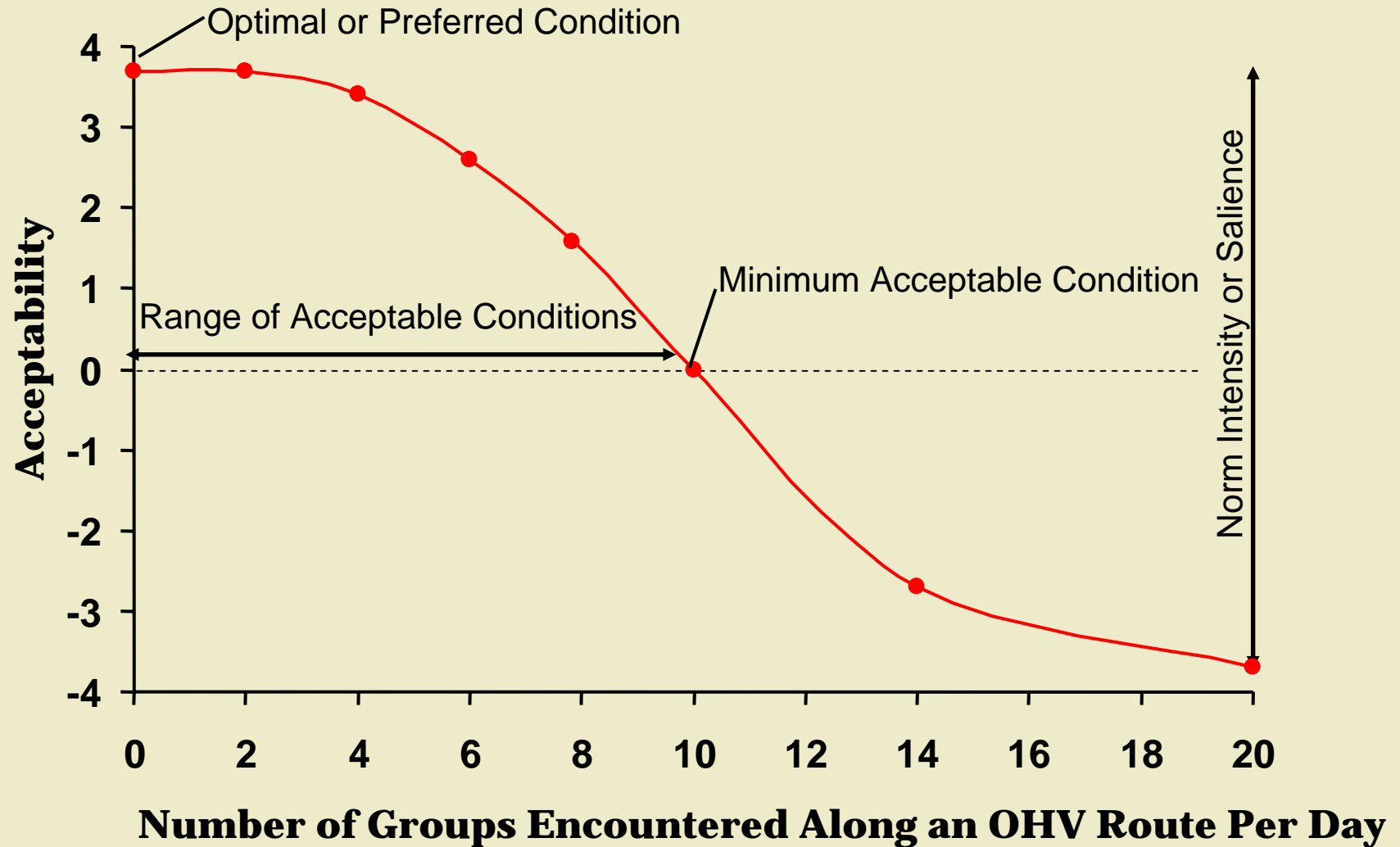
# A Range of Standards

- Four evaluative dimensions:

Preference ← Acceptability / Management Action → Displacement

- Evaluative dimensions provide a range of standards that can be used based on the context of application

Backcountry vs. Frontcountry

# Carrying Capacity

- The point at which impacts of visitor use violate standards of quality for relevant indicator variables

- Three components:

Social / Experiential

Resource

Carrying Capacity

Managerial
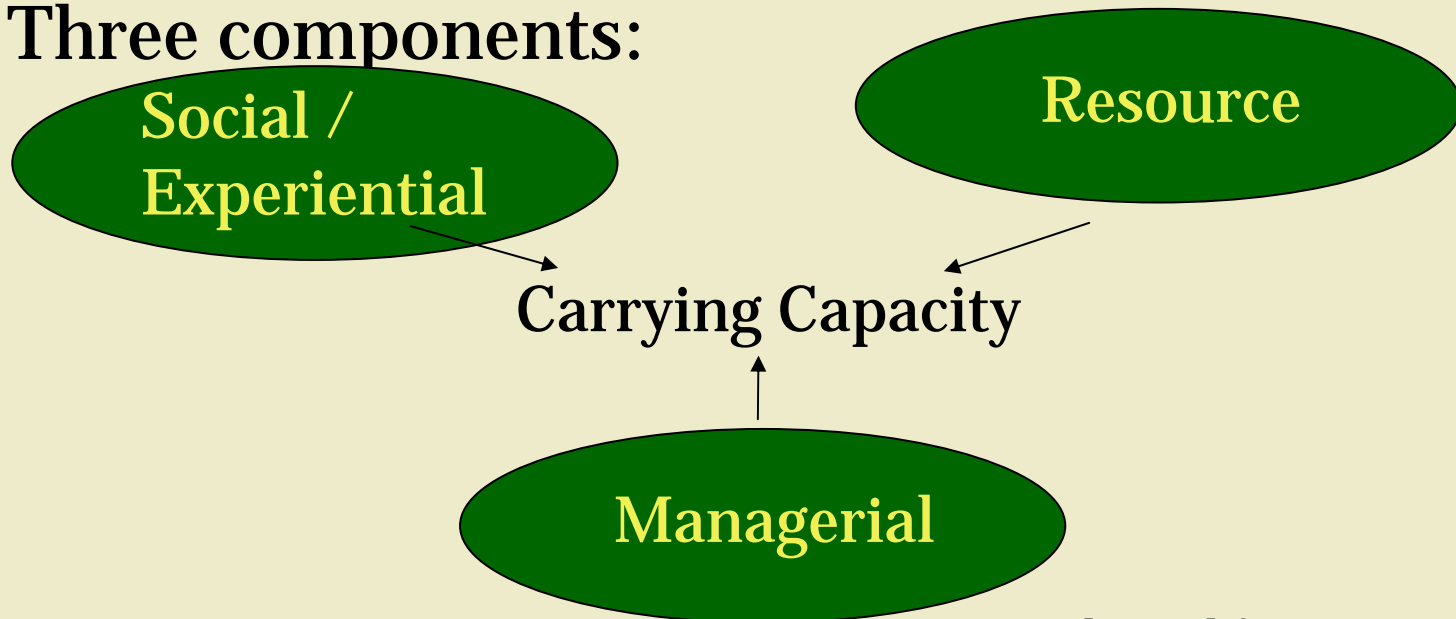
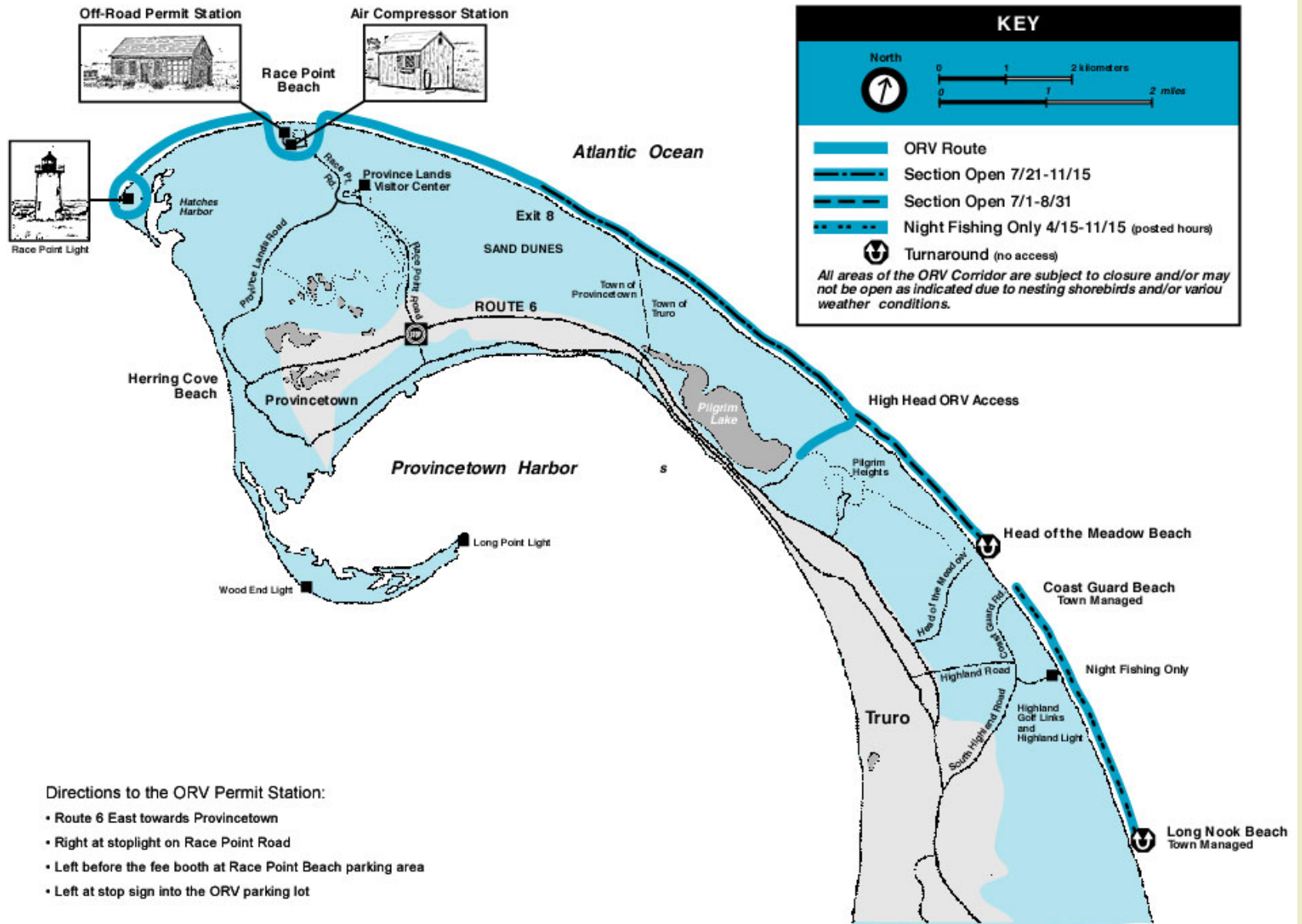*Adapted from Manning (1999)*

# Cape Cod OHV Use Study

# Cape Cod OHV Route

# Study Objectives

• Develop baseline data on OHV use – types of users, use patterns, socio-economic and demographic characteristics of users, and trip motivations

• Determine visitor attitudes towards alternative OHV management practices

• Identify potential indicators and standards of quality for the OHV visitor experience

# Phase I - Indicators of Quality for the OHV Experience

# Study Methods

• Semi-structured interviews were conducted with OHV users

• A purposive sampling approach was used for breadth of response

• Interviewees were chosen based on one of several desired sampling categories:

- • Annual vs. weekly permit holder
- • Men vs. women
- • Age
- • SCV vs. non-SCV users
- • Activity engaged in (fishing, "beaching it", painting, socializing, etc.)
- • Location on OHV route

# Study Analysis

• Interviews transcribed verbatim

• Content analysis was performed on each interview

• Interviews were coded based on procedures described by Patton (2002) and Miles & Huberman (1994)

    • Coding is the process of segmenting data into simpler, general categories and is used to expand and tease out new questions and levels of interpretation (Coffey & Atkinson, 1996)

    • Codes were developed inductively (Straus & Corbin, 1990) – as they emerged from the text of the transcripts – but the structured questions were used as an organizing framework

# Data Collection Summary

- 61 interviews conducted during the following periods
    - 2 interviews on May 19, 2004
    - 26 interviews between July 19-24, 2004
    - 22 interviews between August 20-22, 2004
    - 11 interviews between October 17-19, 2004
- 700+ pages of transcribed interview data
- Each desired sampling category is represented in the interview data

# What things make for a good day using your OHV at CACO?

| Code | Frequency |
|---|---|
| Good weather/ocean/beach conditions | 26 |
| Good fishing | 24 |
| It's perfect as it is/any day is a good day | 9 |
| Peaceful/relaxing/escape stress of daily life | 8 |
| Solitude/lack of crowds/less people | 8 |
| Socializing and spending time with friends and family | 7 |
| Wildlife/nature to watch | 4 |
| Minimal closures/an open OHV route | 2 |
| No conflicts in uses (swimmers and fishers) | 2 |
| Miscellaneous | 1 |
| Meeting nice people on the OHV route | 1 |
| Helpful or unobtrusive NPS interactions | 1 |
| No litter on the beach | 1 |

## Describe your ideal OHV experience at CACO. For example – What are you doing? What are other people doing? What are beach conditions like?

| Code | Frequency |
|---|---|
| Good weather/beach conditions | 18 |
| Good fishing | 17 |
| Social experiences with friends and family | 13 |
| Solitude/lack of crowds/less people | 11 |
| It's already an ideal experience | 8 |
| Peaceful/relaxing | 6 |
| Nature/wildlife to watch | 6 |
| Miscellaneous | 4 |
| Meet friendly people on the OHV route | 4 |
| Helpful or unobtrusive NPS | 3 |
| Open access to OHV route/no closures | 3 |
| No trash on beach | 2 |
| Having an inter-dune route for public OHV use | 1 |

# How has your experience using OHV'S at CACO changed for the better or worse over the years?

| Code | Frequency |
|---|---|
| **Worse** | **51** (1) |
| Bird-related closures of OHV route/less space on OHV route | 16 |
| More people/crowded | 16 |
| More difficult to get a permit | 11 |
| Fishing used to be better | 2 |
| Historical uses have been degraded | 2 |
| More restrictions on use | 2 |
| Fees are going up, but service levels are not | 1 |
| **Better** | **16** (3) |
| More experience has lead to more enjoyment | 5 |
| Facilities have improved/air pumps/port-a-potties | 3 |
| NPS enforcement is more evenhanded/better | 3 |
| Personal equipment (vehicle) has improved | 1 |
| Can now share with friends and family | 1 |
| **It hasn't changed for either the better or worse** | **7** |

# What could be done to improve the quality of your OHV experience at CACO?

| Code | Frequency |
|---|---|
| Reduce closures/open up more of the OHV route | 10 |
| Nothing/it's perfect as it is | 10 |
| Improve permitting process | 9 |
| Add air stations/dumpster/water/a boat trailer corral | 8 |
| Miscellaneous | 6 |
| Reduce litter on the OHV route | 6 |
| Better/more consistent enforcement of existing regulations/policies consistent within seashore and among NPS seashores | 5 |
| More/better maintained port-a-potties on the OHV route | 5 |
| Increase number of permits given out | 4 |

# What could be done to improve the quality of your OHV experience at CACO? (Con't)

| Code | Frequency |
|---|---|
| Provide more/better information about closures | 3 |
| Reduce crowding | 2 |
| Open an inter-dune route for OHV use | 2 |
| Provide more fire permits | 1 |
| Address conflict between swimmers and fishermen | 1 |
| Reduce visual and space impacts of SCV's | 1 |
| Reduce the number of weekly permits | 1 |
| Open the SCV area more or to more than 100 vehicles | 1 |

# Top OHV Indicators of Quality Emerging from the Interviews

- Crowding

- Portion of the OHV route open

- Ease of obtaining a permit

- Amount of litter on the OHV route

- Facilities on and off the OHV route

- Behavior and actions of other OHV users

**Phase II – Standards of Quality for the OHV Experience**

# Phase II Methodology

• Quantitative surveys were completed by OHV users

•Respondents were randomly selected as they exited the OHV route

• Surveys were self-administered, but a trained surveyor was available for assistance

# Survey Numbers and Locations

- Total of 108 questionnaires were collected between July 9 and August 8, 2005

## 0 OHVs



## 8 OHVs



## 16 OHVs

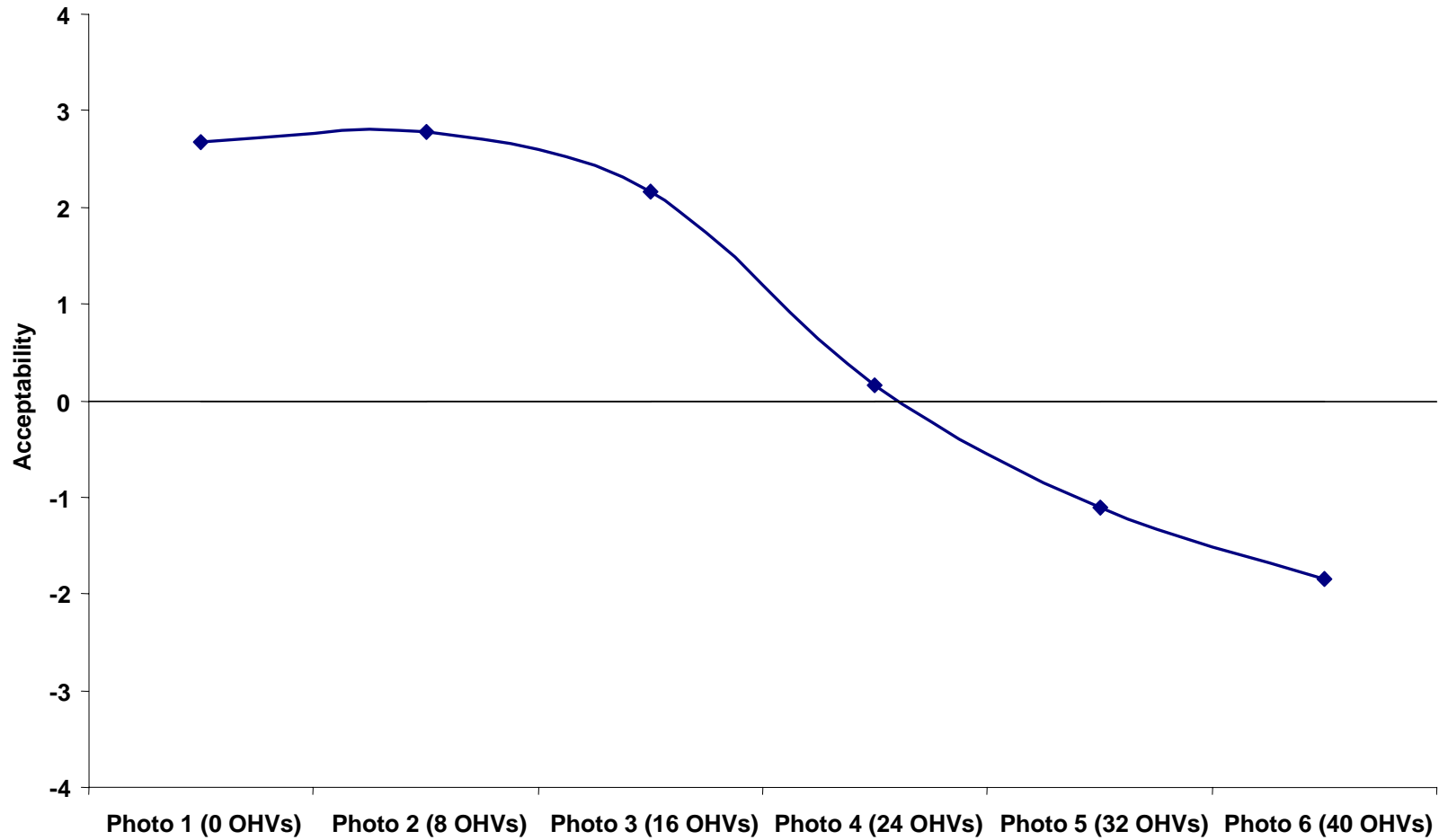## 24 OHVs



## 32 OHVs



## 40 OHVs

We would like to know how many OHVs you think could use the **Race Point/Hatches Harbor area of the OHV route – the area north of the public, walk-in beach**. To help judge this, we have a series of photographs that show different numbers of OHVs at this area. Please look at the photographs on Poster A and answer the following questions as they pertain to the Race Point/Hatches Harbor area of the OHV route.

| | Very Unacceptable | | | | | | | | Very Acceptable | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | |
| Photo 1 (0 OHVs) | 6.5 | 1.1 | 2.2 | 0.0 | 7.5 | 6.5 | 3.2 | 4.3 | 68.8 | 2.7 |
| Photo 2 (8 OHVs) | 3.3 | 2.2 | 1.1 | 0.0 | 4.4 | 6.6 | 11.0 | 14.3 | 57.1 | 2.8 |
| Photo 3 (16 OHVs) | 5.4 | 2.2 | 1.1 | 2.2 | 6.5 | 10.8 | 16.1 | 18.3 | 37.6 | 2.2 |
| Photo 4 (24 OHVs) | 16.5 | 5.5 | 11.0 | 5.5 | 9.9 | 15.4 | 13.2 | 7.7 | 15.4 | 0.2 |
| Photo 5 (32 OHVs) | 25.8 | 16.1 | 10.8 | 8.6 | 9.7 | 9.7 | 4.3 | 6.5 | 8.6 | -1.1 |
| Photo 6 (40 OHVs) | 44.6 | 8.7 | 14.1 | 2.2 | 9.8 | 8.7 | 2.2 | 1.1 | 8.7 | -1.8 |

n = 91 to 93

**Social Norm Curve: Use Levels on the OHV Route (Race Point/Hatches Harbor)**

# Which photograph shows the level of use you would prefer to see in the Race Point/Hatches Harbor area of the OHV route?

|  | Frequency | Percent |
|---|---|---|
| Photo 1 (0 OHVs) | 12 | 12.8 |
| Photo 2 (8 OHVs) | 15 | 16.0 |
| Photo 3 (16 OHVs) | 43 | 45.7 |
| Photo 4 (24 OHVs) | 14 | 14.9 |
| Photo 5 (32 OHVs) | 5 | 5.3 |
| Photo 6 (40 OHVs) | 5 | 5.3 |
| Total | 94 | 100.0 |

Mean = 3.0 (16.0)   Median = 3 (16)   Std. Deviation = 1.2

# Which photograph shows the level of use that is so unacceptable that you would no longer use the Race Point/Hatches Harbor area of the OHV route? (If none of the photographs represent this condition, you may indicate that.)

|  | Frequency | Percent |
|---|---|---|
| Photo 1 (0 OHVs) | 1 | 1.1 |
| Photo 2 (8 OHVs) | 1 | 1.1 |
| Photo 3 (16 OHVs) | 2 | 2.2 |
| Photo 4 (24 OHVs) | 10 | 11.0 |
| Photo 5 (32 OHVs) | 15 | 16.5 |
| Photo 6 (40 OHVs) | 29 | 31.9 |
| None of the photographs are so unacceptable that I would no longer use this area | 33 | 36.3 |
| Total | 91 | 100 |

Mean = 5.1 (32.8)   Median = 6 (40)   Std. Deviation = 1.1

## Which photograph shows the highest level of use that you think the National Park Service should allow in the Race Point/Hatches Harbor area of the OHV route? In other words, at what point should visitors be restricted from using this area? (If use should not be restricted at any point represented by the photographs, or not restricted at all, you may indicate that.)

|  | Frequency | Percent |
|---|---|---|
| Photo 1 (0 OHVs) | 1 | 1.1 |
| Photo 2 (8 OHVs) | 4 | 4.4 |
| Photo 3 (16 OHVs) | 16 | 17.6 |
| Photo 4 (24 OHVs) | 21 | 23.1 |
| Photo 5 (32 OHVs) | 16 | 17.6 |
| Photo 6 (40 OHVs) | 11 | 12.1 |
| Visitor use should not be restricted | 8 | 8.8 |
| None of the photographs show a high enough level of use to restrict visitors from using this area | 14 | 15.4 |
| Total | 91 | 100.0 |

Mean = 4.2 (25.6)    Median = 4 (24)   Std. Deviation = 1.2

# Which photograph looks most like the level of use you typically saw in the Race Point/Hatches Harbor area of the OHV route today?

|  | Frequency | Percent |
|---|---|---|
| Photo 1 (0 OHVs) | 2 | 2.4 |
| Photo 2 (8 OHVs) | 21 | 25.0 |
| Photo 3 (16 OHVs) | 24 | 28.6 |
| Photo 4 (24 OHVs) | 26 | 31.0 |
| Photo 5 (32 OHVs) | 7 | 8.3 |
| Photo 6 (40 OHVs) | 4 | 4.8 |
| Total | 84 | 100.0 |

Mean = 3.3 (18.4)   Median = 3 (16)   Std. Deviation = 1.2

# Summary Table

| Evaluative Dimension | Mean | Median |
|---|---|---|
| Preference | 3.0 (16.0) | 3 (16) |
| Acceptability | 4.2 (25.6) | |
| Management action | 4.2 (25.6) | 4 (24) |
| Displacement | 5.1 (32.8) | 6 (40) |
| Typically seen | 3.3 (18.4) | 3 (16) |

## 0 Pieces



## 20 Pieces

## 40 Pieces



## 60 Pieces

## 80 Pieces



## 100 Pieces

**Please rate each photograph by indicating how acceptable you think it is based on the amount of litter shown.  A rating of "-4" means the amount of litter is very unacceptable, and a rating of "+4" means amount of litter is very acceptable.**

| | Very Unacceptable | | | | | | | | Very Acceptable | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | |
| Photo 1 (0 Pieces) | 1.3 | 0.7 | 1.3 | 2.6 | 0.0 | 4.6 | 0.0 | 0.7 | 88.9 | 3.50 |
| Photo 2 (20 Pieces) | 32.4 | 2.7 | 4.1 | 8.1 | 5.4 | 14.2 | 10.8 | 12.8 | 9.5 | -0.42 |
| Photo 3 (40 Pieces) | 50.3 | 7.4 | 8.1 | 8.7 | 8.1 | 5.4 | 4.0 | 2.7 | 5.4 | -2.05 |
| Photo 4 (60 Pieces) | 65.8 | 10.7 | 10.7 | 3.4 | 3.4 | 2.0 | 0.0 | 0.7 | 3.4 | -3.03 |
| Photo 5 (80 Pieces) | 78.8 | 11.3 | 2.6 | 2.6 | 0.7 | 0.0 | 0.7 | 0.0 | 3.3 | -3.42 |
| Photo 6 (100 Pieces) | 90.1 | 4.0 | 2.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 3.3 | -3.62 |

**Social Norm Curve: Litter on the OHV Route**
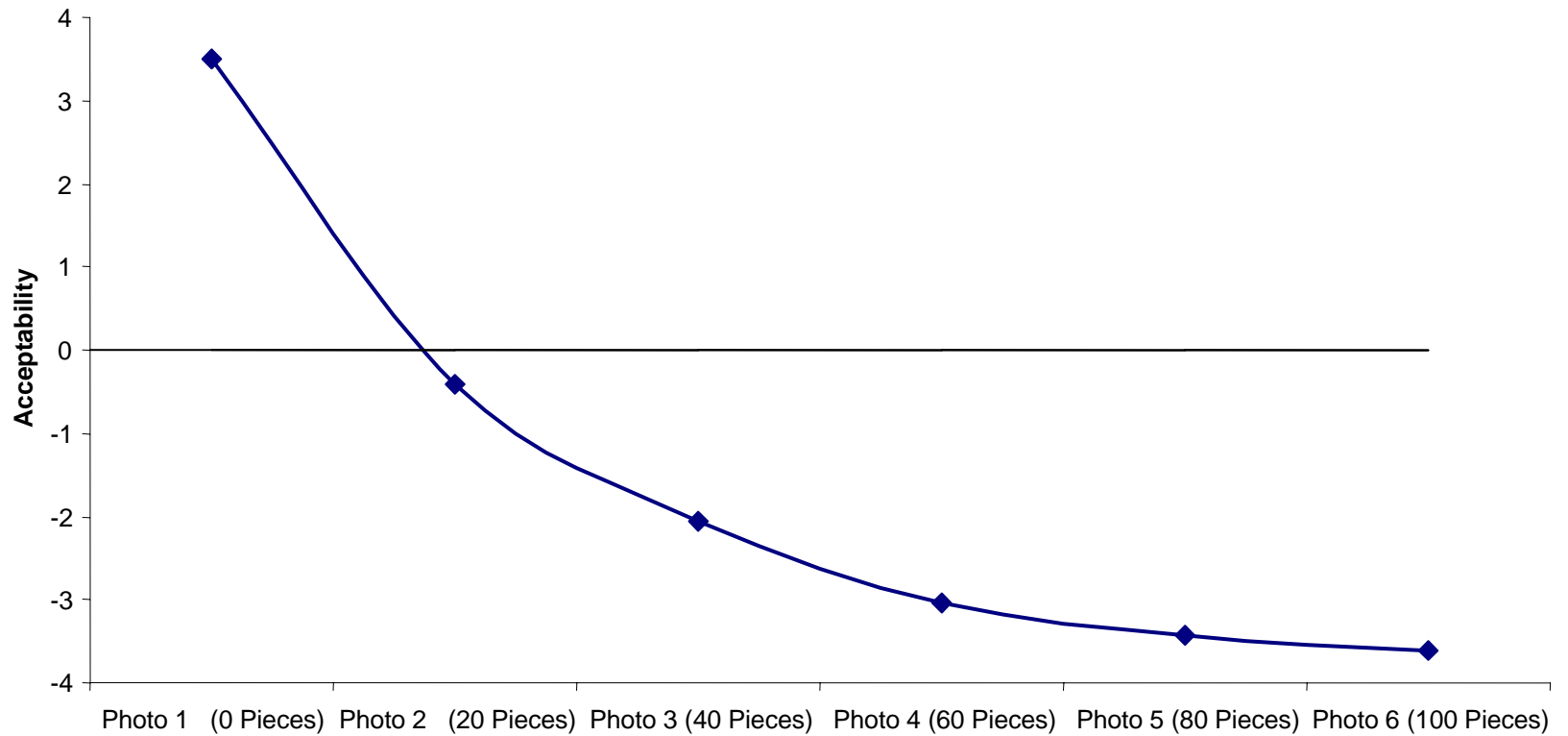
# Summary Table

| Evaluative Dimension | Mean | Median |
|---|---|---|
| Preference | 1.3 (6.0) | 1 (20) |
| Acceptability | 1.9 (17.9) | |
| Management action | 2.4 (28.0) | 2 (20) |
| Displacement | 3.9 (58.0) | 4 (60) |
| Typically seen | 1.6 (12.0) | 1 (0) |

**People sometimes have to wait in a line to get their OHV permit. We would like to know how long you think it is acceptable to wait in a line to obtain your OHV permit. Please rate the acceptability of each of the following waiting times to get an OHV permit. A rating of "-4" means the waiting time is "very unacceptable", and a rating of "+4" means the waiting time is "very acceptable."**

| | Very Unacceptable | | | | | | | | Very Acceptable | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | |
| No waiting time | 0.7 | 0.0 | 0.7 | 0.0 | 2.1 | 1.4 | 2.1 | 1.4 | 91.7 | 3.72 |
| 5 minutes | 0.0 | 0.7 | 0.7 | 0.0 | 1.4 | 2.8 | 3.5 | 7.7 | 83.1 | 3.62 |
| 15 minutes | 2.1 | 0.0 | 1.4 | 0.7 | 4.2 | 5.6 | 7.0 | 16.1 | 62.9 | 3.08 |
| 30 minutes | 3.5 | 2.1 | 0.7 | 4.2 | 9.8 | 15.4 | 10.5 | 16.8 | 37.1 | 2.09 |
| 1 hour | 21.8 | 0.0 | 4.9 | 16.9 | 11.3 | 11.3 | 8.5 | 8.5 | 16.9 | 0.07 |
| 2 hours | 36.0 | 5.8 | 12.2 | 12.9 | 9.4 | 6.5 | 5.8 | 7.2 | 4.3 | -1.42 |
| 3 hours | 47.4 | 13.9 | 10.9 | 5.8 | 6.6 | 5.1 | 3.6 | 2.2 | 4.4 | -2.23 |
| 6 hours | 68.6 | 10.7 | 6.4 | 3.6 | 4.3 | 2.1 | 0.7 | 1.4 | 2.1 | -3.06 |
| One day | 85.7 | 4.3 | 2.1 | 1.4 | 4.3 | 0.0 | 0.7 | 0.0 | 1.4 | -3.54 |
| Two days | 90.1 | 2.1 | 0.0 | 0.7 | 4.3 | 0.7 | 0.0 | 0.0 | 2.1 | -3.58 |

Social Norm Curve: Waiting Time to Get an OHV Permit
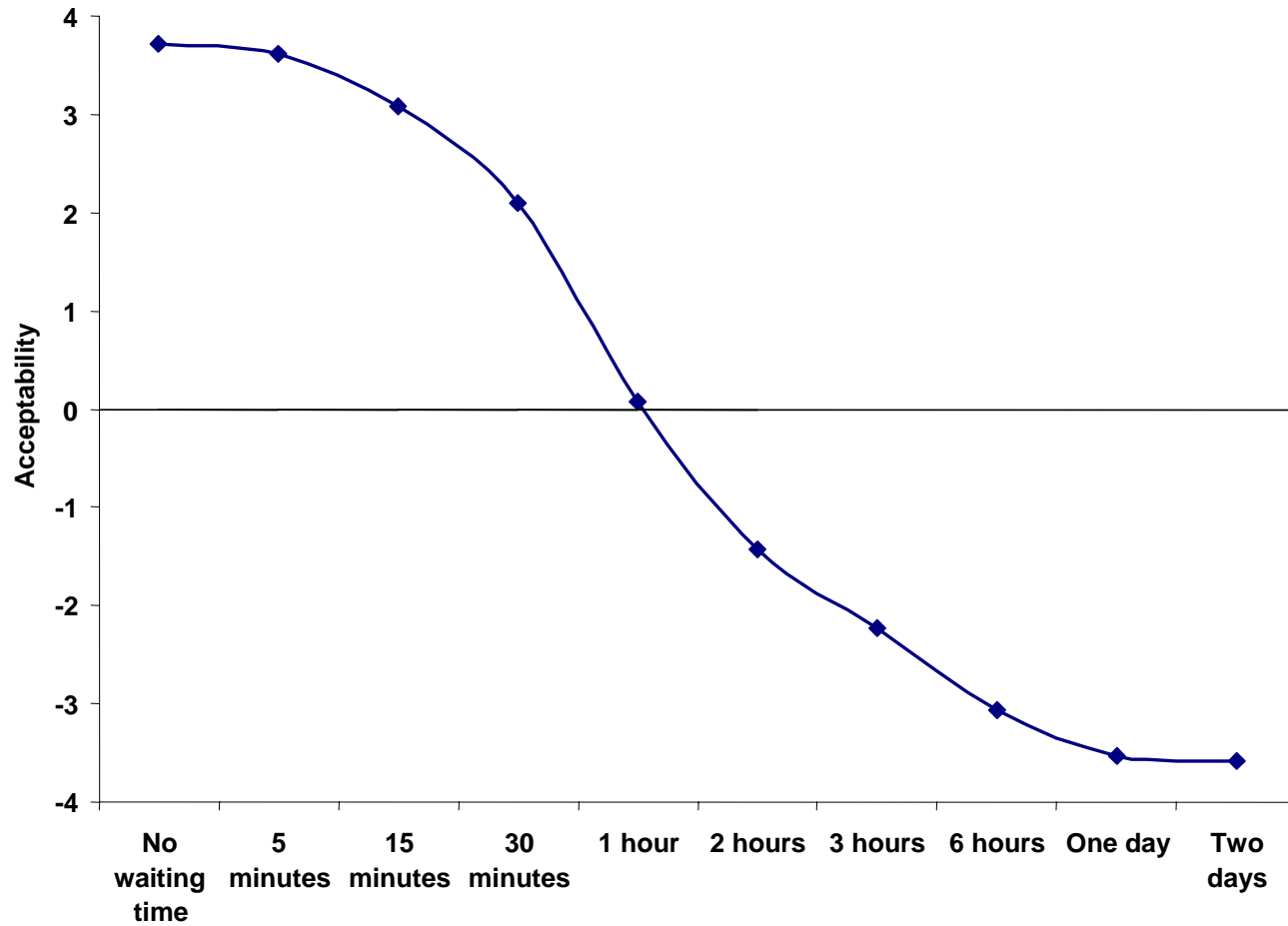
# Management Implications

Indicators and standards developed in this study can be used to manage for a quality OHV experience:

- Provide a basis for setting a daily use limit or revisiting the number of OHV permits sold

- Provide information on when litter begins to impact OHV users

- Provides indication of when permitting process becomes too arduous for visitors

# Summary of the Indicators and Standards Approach

- Useful for addressing both experiential and resource impacts of OHV use

- Empirical

- Based on public input

- Defensible

- Provides information to balance OHV access and protection of resource

**UVM Park Studies Laboratory Website:**

   **http://www.uvm.edu/envnr/parkstudies/**

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**Thank You!**